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Bactrodesmium chinense and *B. lushanense* spp. nov. and *B. novageronense* newly recorded from China

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Abstract—Three specimens of *Bactrodesmium* were collected on dead branches of unidentified plants from subtropical forests in Jiangxi, China. Two represent new species: *B. chinense* is distinguished by its ellipsoidal to broadly fusiform 9–11-euseptate verrucose reddish brown conidia with pale brown to subhyaline end cells; *B. lushanense* is characterized by its variably shaped (obovoid, clavate, ellipsoid) verrucose dark brown to black conidia with 3–6 dark-banded eusepta and paler basal cells. The third specimen represents, *B. novageronense*, a new record for China. The three species are described, illustrated, and compared with similar taxa.

Key words—asexual fungi, hyphomycetes, saprobes, taxonomy

Introduction

Bactrodesmium Cooke was established by Cooke (1883) with *Sporidesmium abruptum* Berk. & Broome [≡ *B. abruptum* (Berk. & Broome) E.W. Mason & S. Hughes] later designated by Hughes (1958) as the type species. The genus is characterized by scattered or clustered punctiform dark sporodochial conidiomata that sometimes become synnematal, inconspicuous fasciculate hyaline to brown conidiophores, and solitary acrogenous variably shaped (clavate, cylindrical, ellipsoidal or obovoid), euseptate conidia formed from monoblastic integrated terminal determinate conidiogenous cells (Ellis 1959, 1971; Seifert & al. 2011). Conidial secession is still not clearly defined for *Bactrodesmium* (Zucconi & Lunghini 1997, Markovskaja 2006, Koukol & Kolářová 2010). Although Zucconi & Lunghini (1997), who critically examined an authentic exsiccatum specimen of *S. abruptum* (Rabenhorst, Fungi Europaei 12: no.1163, 1868), suggested that conidial secession in *Bactrodesmium* should be schizolytic, species with rhexolytic conidial secession continue to be placed in *Bactrodesmium* (Cooper 2005, Koukol & Kolářová 2010, Hernández-Restrepo & al. 2013, Arias & al. 2016). Consequently, the genus has become a heterogeneous assemblage with the addition of unusual species with polyblastic conidiogenous cells (e.g., *B. diversum* Hern.-Restr. & al.), distoseptate conidia (e.g., *B. gabretae* Koukol & Kolářová) and even both euseptate and distoseptate conidia (e.g., *B. rahmii* M.B. Ellis) (Ellis 1976, Koukol & Kolářová 2010, Hernández-Restrepo & al. 2013). Thus, *Bactrodesmium* needs further taxonomic study.

Index Fungorum (2020) lists about 62 species and variety names in *Bactrodesmium*, of which 48 are currently accepted, mostly described from rotten wood, dead bark, and decaying twigs.

Bactrodesmium has been infrequently reported from China, with only six species recorded (Lu & al. 2000, Zhao & al. 2009). During surveys of saprobic microfungi in southern China, three specimens clearly related to *Bactrodesmium* were collected on dead branches. Two of these are proposed here as new species, *B. chinense* and *B. lushanense*, and the third was identified as *B. novageronense*, a new record from China.

Materials & methods

Samples of dead branches were collected and placed in Ziploc™ plastic bags for transport to the laboratory, where they were processed, and examined as described by Ma & al. (2011). The material was photographed using a Nikon Eclipse E200 microscope with a 100× (oil immersion) objective and SmartV550Dc digital camera. The microphotographs were assembled into plates using Adobe Photoshop 7.0.

Taxonomy

Bactrodesmium chinense Z.H. Xu, Jian Ma, R.F. Castañeda & X.G. Zhang, **sp. nov.** FIG. 1

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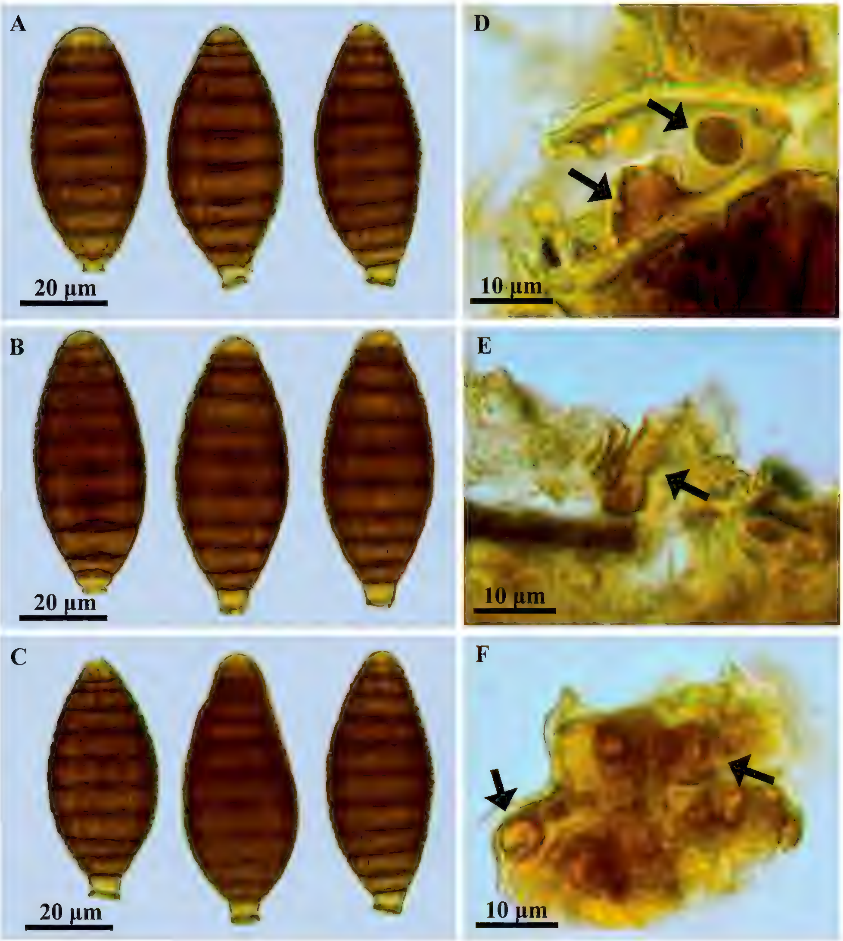

Fig. 1. *Bactrodesmium chinense* (holotype, HJAUP M0282).
A–C. Conidia; D–F. Conidiogenous cells (arrows).

Differs from *Bactrodesmium ellipsoideum* and *B. submoniliforme* by its larger (9–)10(–11)-euseptate reddish brown conidia with pale brown to subhyaline end cells.

Type: China, Jiangxi Province, Jinggangshan Mountain, 26°40′N 114°16′E, on dead branches of an unidentified broadleaf tree, 6 November 2014, J. Ma (**Holotype**, HJAUP M0282).

Etymology: referring to China, where the fungus was collected.

Sporodochia on dead branches scattered or clustered, punctiform, dark brown. Mycelium immersed and superficial; hyphae branched, septate, smooth, subhyaline to pale brown. Conidiophores micronematous or semi-macronematous, simple, smooth, comprising a single conidiogenous cell. Conidiogenous cells monoblastic, integrated, terminal, determinate, cylindrical, brown to pale brown, 5–13.5 × 5–6.5 µm. Conidial secession rhexolytic. Conidia solitary, dry, acrogenous, ellipsoidal to broadly fusiform, 54–63.5 × 23.5–26.5 µm, (9–)10(–11)-euseptate, verrucose, reddish brown except for the pale brown to subhyaline cell at each end, apex rounded, base truncate, 4.5–6.5 µm diam.

Comments—In terms of conidial morphology, *Bactrodesmium chinense* is most similar to *B. ellipsoideum* P.Rag. Rao and *B. submoniliforme* Hol.-Jech.. However, *B. ellipsoideum* conidia are smaller (30–42 × 9–12 µm) and further distinguished by their ellipsoidal to oval shape, subhyaline to yellowish brown color, and fewer (5–6) eusepta (Rao 1983), while *B. submoniliforme* conidia are also smaller [(25–)30–42.5(–45) × (6–)7–10(–12.5) µm] and differ in their fewer [(5–)8–10] eusepta, pale brown to brown color, pale to hyaline apical cell, and pale brown to subhyaline basal cell (Holubová-Jechová 1972). *Listeromyces insignis* Penz. & Sacc. is superficially similar to *B. chinense* in conidial morphology, but its conidia secede by schizolytic fracture (Goos 1971, Seifert & al. 2011).

Bactrodesmium lushanense Z.H. Xu, Jian Ma, R.F. Castañeda & X.G. Zhang, **sp. nov.** Fig. 2

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Differs from *Bactrodesmium palmicola* and *B. microleucurum* in its (3–)5(–6)-euseptate dark brown to black conidia with paler basal cells; differs additionally from *B. microleucurum* in its verrucose conidia.

Type: China, Jiangxi Province, Lushan Mountain, 29°33′N 115°58′E, on dead branches of an unidentified broadleaf tree, 18 October 2016, J. Ma (**Holotype**, HJAUP M0455).

Etymology: refers to Lushan Mountain, where the fungus was collected.

Sporodochia on dead branches scattered or clustered, punctiform, dark brown. Mycelium immersed and superficial; hyphae branched, septate, smooth, subhyaline to pale brown. Conidiophores micronematous or semi-macronematous, simple or branched, smooth, 0–2-septate, pale brown to brown, ≤25 µm long, 2.5–3 µm diam. Conidiogenous cells monoblastic, integrated, terminal, determinate, cylindrical. Conidial secession rhexolytic. Conidia solitary, acrogenous, dry, obovoid, clavate or ellipsoid, (3–)5(–6) euseptate, septa forming dark bands, (14–)25.5–41.5 × (7.5–)14–18.5 µm, dark brown to black, basal cell paler, verrucose, apex rounded, base truncate, 2–2.5 µm diam.

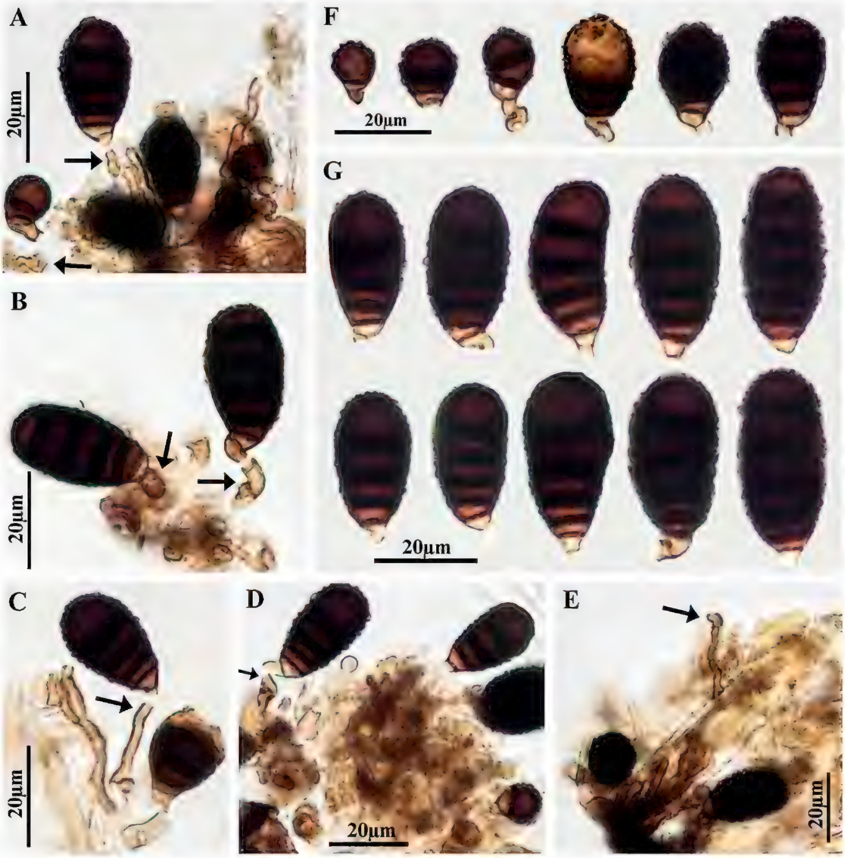

FIG. 2. *Bactrodesmium lushanense* (holotype, HJAUP M0455).
A–E. Conidiophores, conidiogenous cells (arrows) and conidia;
F. Developing conidia; G. Conidia.

COMMENTS—*Bactrodesmium lushanense* most closely resembles *B. palmicola* Mercado & al. and *B. microleucurum* (Speg.) M.B. Ellis in conidial shape. However, *B. palmicola* is distinguished by its 3–4-euseptate, brown conidia with paler basal cells and black apical cells (Mercado-Sierra & al. 1995); and *B. microleucurum* is distinguished by its 2–5-euseptate, smooth, larger (30–48 × 18–25 µm) conidia with wider bases (4–5 µm diam.; Ellis 1965).

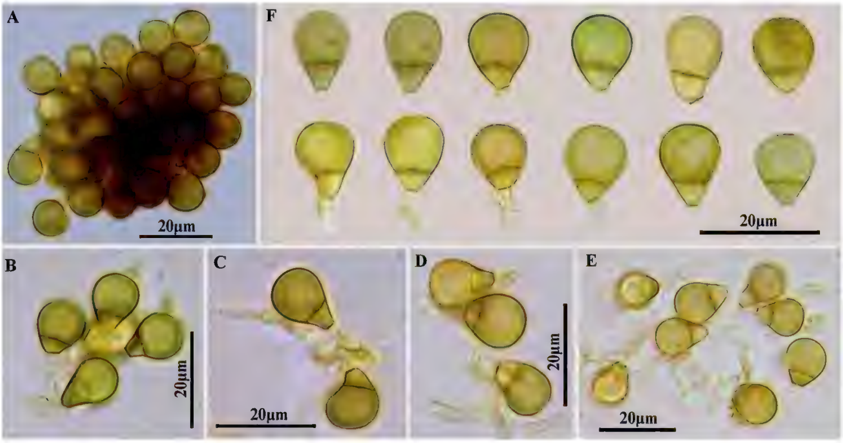

Fig. 3. *Bactrodesmium novageronense* (HJAUP M0225).
A. Sporodochium; B–E. Conidiogenous cells and conidia; F. Conidia.

Bactrodesmium novageronense R.F. Castañeda,
Deuteromyc. Cuba, Hyphomyc. 2: 2, 1985. Fig. 3

Sporodochia on dead branches scattered, pulvinate or punctiform, golden olivaceous brown. Mycelium immersed and superficial; hyphae branched, septate, smooth, subhyaline to very pale brown. Conidiophores micronematous or semi-macronematous, aggregated, simple or branched, smooth, 0–2-septate, subhyaline, ≤15 µm long, 2–3 µm diam. Conidiogenous cells monoblastic, integrated or discrete, terminal, determinate, cylindrical, hyaline. Conidial secession rhexolytic. Conidia solitary, dry, acrogenous, pyriform, obovoid to subglobose, smooth, golden brown to pale brown, 12.5–14.5 × 9–10.5 µm, 1-euseptate, apical cell hemispherical, 7.5–10 × 9.5–10.5 µm, basal cell cuneiform, 3.5–4.5 × 4–5.5 µm, with a distinct 1.5–2.5 µm wide basal frill.

specimens examined: CHINA, Jiangxi Province, Lushan Mountain, 29°33 N 115°58 E, on dead branches of unidentified broadleaf tree, 8 November 2014, J. Ma (HJAUP M0221, HJAUP M0225).

Comments—*Bactrodesmium novageronense* is reported for the first time from China. It is most similar to *B. simile* R.M. Arias & al. in producing 1-euseptate conidia, but *B. simile* is easily distinguished by its larger conidia (19–24 × 12–16 µm; Arias & al. 2016). The Chinese collection fits well with the original description of *B. novageronense*, but it has somewhat longer conidia than the Cuban material (8–13 µm; Castañeda-Ruíz 1985).

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